



APRIL, MDCGCLIX.

THE ZOOLOGIST:
A
POPULAR MONTHLY MAGAZINE
OF
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AND
JOURNAL FOR RECORDING FACTS & ANECDOTES
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A FAMILIAR INTRODUCTION
TO THE
HISTORY OF INSECTS
WITH GLOSSARIAL INDEX.

By EDWARD NEWMAN, Memb. Imp. L.-C. Acad., F.L.S., F.Z.S.,
Late President of the Entomological Society.

THIS work is illustrated by a profusion of engravings, executed in the first style of the art, from the author's own drawings on the wood. It is divided into four parts. The *first* gives a detailed account of the habits and manners of the most interesting insects, and a description of their wonderful transformations. The second treats of capturing, killing and preserving insects, and of constructing cabinets: the most ample details are given, and the author has taken especial pains to explain the most expeditious mode of killing insects, in order to inflict no unnecessary pain on the insects themselves, and also to save the feelings of the humane and kind-hearted. In the *third* part the author describes, in an easy and popular manner, the structure of insects, using language which all may understand, yet never deviating from scientific accuracy. The *fourth* part gives a sketch of the classification of insects; and the work concludes with a very complete GLOSSARIAL INDEX, each technical word having an explanation as well as reference.

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JOHN VAN VOORST, PATERNOSTER ROW.

Topsell's "History of the Wasp." By FREDERICK SMITH, Esq.

A FEW pages might, we think, be occupied with far less amusing matter than a few extracts from the "History of the Wasp," as given in "The History of Serpents; or, the second Book of living Creatures: wherein is contained their Divine, Natural and moral descriptions, with their lively Figures, Names, Conditions, Kindes and Natures of all venomous Beasts: with their several Poysons and Antidotes; their deep hatred to Mankind, and the wonderful work of God in their Creation and Destruction. London, 1608. By Edward Topsell."

In the first place, our author describes a wasp as "a kinde of insect, that is swift, living in routs and companies together, having somewhat a long body encircled, with four membranous wings, without bloud, stinged inwardly, having also six feet, and a yellow colour; the body seemeth to be fastened and tyed together in the midst of the breast with a certain fine thread or line, so that they seem very feeble in their loins, or rather to have none at all."

After this very graphic description, it will be most orderly if we turn to our author's opinion as to their origin, for we have no intention of following the order of things as given in this delectable history, but just to pick out such morsels as shall give the reader a tolerable idea of the history of the wasp, as recorded two hundred and fifty years ago.

"They differ also in their first breeding, stock, sex, place, feeding, and manner of labour: some say wasps do first proceed from the rotten carkases of dead asses; but I am rather moved to think they were first bred from the dead body of some warlike and fierce horse. And surely their incredible swiftnesse in their flight, their ardent and burning desire they have to fighting, are sufficient inducements to move me to think that they took their first beginning from some gallant horse. And I rather lean to this side because else I do not know what sense I should give to that Aristotelian proverb, 'All hail, ye daughters of swift-footed horses;' for, besides the truth that lieth in the bare words, I take the morall of it to be uttered as a witty check, or a figurative flout, conceitedly to rebuke and hit in the teeth those shrewd women, curst and scolding wives, which are so peevish that they will not be pacified, who are like unto wasps in their sullen, displeasing humours, tempestuous madness and pelting chafe."

Their nests, says worthy Topsell, are "light, slender and thin, like paper, dry, transparent, gummy not thin, and all made of one fashion, but very different, some of them representing a harp, some made much



after the fashion of a pear, a toadstool, a bottle, or budget of leather, and some like a standing cup with handles."

"They have such a tender care over their females (especially at such times as they are great with young), and suffer them so much to have their own wills, as they will neither permit them to take any pains abroad for their living, nor yet to seek for their meat at home; but the males flying about, like good purveyors, bring all home to their own dwellings, thereby, as it were, strictly enjoying the females to keep themselves within doors."

"They make their combs in the beginning of summer, fashioning their small cells with four little doors, wherein small worms do breed; these increase for the most part in autumn, not in the spring, and especially in the full of the moon. This one thing here is to be noted, that wasps do not swarm, and that in summer time they are subject to kings, and in winter the females prevail. And when they have renewed and repaired their issue with a great supply, and that they be fresh and lusty, the empire again returneth to the masculine kind."

"Wasps are not long-lived, for their dukes (who live longest) do not exceed two years; and the labouring, that is the male wasps, together with autumn do end their days. Yea, which is more strange, whether their dukes or captains of the former year, after they have ingendered and brought forth new spring-up dukes, do die, together with the new wasps, and whether this do come to passe after one and the self-same order, or whether yet they do and may live any longer time, divers men do diversly doubt."

Our author informs us further, that there are two kinds of wasps, one "wilde and fell," the other "meek and quiet;" of the former kind he once found a colony in Essex, in a wood, where, as he informs us, "going unwarily to gather simples with another physitian, and offending one of this fumish generation, the whole swarm of them presently rushed forth about mine ears, and surely had I not had in mine hand some sprigs or branches of broom for my defence, I had undoubtedly paid dear for this my unadvisedness, if it had not cost me my life, for they pursued me in every place in the wood, with a vehement rage, for a long season, insomuch that I was fain to take to my heels, and so to seek to save myself from further danger. And if our countryman Sir Francis Drake himself had been there, although he was 'Omnium aucum nostri seculi fortissimus ac famosissimus,' yet I make no doubt but he would have taken my part, and been a companion with me in this my fearful flight."

Worthy old Topsell, notwithstanding the "wild and fell" attack recorded, proceeds to enumerate some of the uses of wasps, which, he says, "is great and singular; for besides that they do serve for food to those kind of hawks which are called kaistrels or fleingals, marti-nets, swallows, owls, to brooks or badgers, and to the camelion: they also do great pleasure and service to men in sundry ways, for they kill the Phalangium, which is a kinde of venomous spider, that hath in all his legs three knots or joynts, whose poyson is perilous and deadly, and yet wasps do cure their wounds." Another and still more remarkable use in the wasp follows; it is, says our author, "very effectual against a quartain ague, if you catch her with your left hand and tie or fasten her to any part of your body (always provided that it must be the first wasp that you lay hold of that year)."

The remedies for the stinging of wasps are too numerous to be given collectively, but a few samples may prove useful and entertaining, with, in the first place, some of the effects produced by their stinging. "Of the stinging of wasps there do proceed divers and sundry accidents, passions and effects, as pain, disquieting, vexation, swelling, rednesse, heat sweatings, disposition or will to vomit, loathing and abhorring of all things, exceeding thirstinesse, and now and then fainting or swounding. I will now set before your eyes and ears one late and memorable example of the danger that is in wasps; of one Allen's wife, dwelling, not many years since, at Lowick, in Northamptonshire, which poor woman resorting, after her usual manner, in the heat of summer, to Drayton, the Lord Mordan's house, being extreemly thirsty, and, impatient of delay, finding by chance a black jack, or tankard, on the table in the hall, she very inconsiderately and rashly set it up to her mouth, never suspecting or looking what might be in it, and suddenly a wasp, in her greedinesse, passed down with the drink, and stinging her, there immediately came a great tumour in her throat with a rednesse, puffing and swelling the parts adjacent; so that her breath being intercepted, the miserable wretch, whirling herself twice or thrice round, fell down and dyed."

Wasps have their enemies, but quaint old Topsell is the only author who I remember that mentions the fox as one of them. "Raynard the fox likewise, who is so full of his wiles and crafty shifting, lies in wait to betray wasps, after this sort. The wily thief thrusteth his bushy tail into the wasps' nest, there holding it so long till he perceive it to be full of them, then drawing it sliely forth, he beateth and smiteth his tail full of wasps against the next stone or tree, never resting so long as he seeth any of them alive; and thus playing his fox-like parts many

times together, at last he setteth upon their combes, devouring all that he can finde. And thus much for the History of the Wasp."

FREDERICK SMITH.

Bees roosting by the Mandibular Process.—Mr. Kearley and M. Guenzius seem both to claim the right of patenting this process, but if priority goes for anything, I have the means of showing that it was very familiar to me as far back as the year 1832, and that by availing myself of this secret I obtained large supplies of two little bees, *Nomada furva* and *N. borealis*, previously unknown to our apiarians, who were very glad to welcome the little strangers when I had the pleasure of introducing them. When I first beheld the process in operation I was at Leominster, in company with my lamented friend Edward Doubleday, whose extended reading *de re entomologicâ* had previously apprised him of a similar fact; and, ever ready with references, he gave me chapter and verse, which, sorrowful to say, I have forgotten; still he was delighted with this ocular demonstration, and remarked, as the fragile grasses gave way in his attempts to withdraw them from the grip of the bees' canines, that they, the bees, were *tenax propositi*. Since that period scarcely a year has past but I have seen bees in a similar situation, and never unaccompanied by a pleasant reminiscence of the delightful excursion during which I first observed this episode in the wild bee's life. When long grass, in "the sear and yellow," hangs over a sandy bee-bank, you may make sure of finding the self-suspended bees attached to the blades on a rainy or cloudy day, or, better still, at early dawn, when the sun with slanting ray gives abundant light but little warmth.—*Edward Newman.*

Note on Xylocopa nigrita, Fabr.—In the fourth volume of the 'Zoologist' (Zool. 1446) will be found some remarks on the habits of *Chelostoma florissomne*, as detailed in the first volume of the 'Entomological Magazine;' the observations appear to have been partly based upon Reaumur's history (theory?) of the development of *Xylocopa violacea*. At p. 160 of the 'Monograph of the Bees of Great Britain,' the following observations occur:—"I take this opportunity of correcting a very widely diffused error, which appears to have originated with Reaumur, as, if his account of the development of *Xylocopa violacea* be correct, it differs from that of every wood-boring bee which inhabits this country: he says, 'When the larva assumes the pupa, it is placed in its cell with its head downwards, a very wise precaution, for thus it is prevented, when it has attained to its perfect state, and is eager to emerge into day, from making its way out upwards and disturbing the tenants of the superincumbent cells, who, being of later date each than its neighbour below stairs, are not yet quite ready to go into public.' Having bred, at various times, nearly all the wood-boring bees which inhabit this country, and having always observed their development to be in the very reverse order to that laid down by the great French naturalist, I have been led to adopt an opinion that Reaumur's account of the bees emerging as he states was conjectural; I could not, judging from the results of my own observations, believe his history to be entirely founded on facts. Still I could not, never having observed the development of a species of *Xylocopa*, speak positively on the subject, and therefore observed that if such was its history it was at variance with every observation which I had made on the development of wood-boring bees." I adduced one or two examples in support of my opinions, showing instances in which the escape of the bee inhabiting

the first cell formed was a matter of impossibility. In the case of *Osmia aurulenta* or *O. bicolor*, constructing their cells in the whorls of a snail-shell, how could the bee in the first-formed cell, at the end of the tube, make its escape? I have on numerous occasions obtained straws and reeds containing cells of bees and wasps, so that by removing a strip the whole of the cells became exposed and a larva was seen in each; in every instance I have found the larvæ of males attain their perfect condition some days earlier than those of females. I have at length had an opportunity of examining the burrows of a species of *Xylocopa*, *X. nigrita*, an inhabitant of Sierra Leone. Mr. J. Foxcroft, who has for some time past been engaged in forming collections of insects in that locality, has from time to time forwarded nests of Hymenoptera to the British Museum, where a log of wood perforated by *Xylocopa nigrita* has just been received. There are three distinct tunnels formed by the bee in the branch; each terminates in the heart of the wood, without any outlet at its apex; one of these has the first cell formed, leaving at the end a short space, like the end of a thimble, unoccupied; the burrows are $1\frac{3}{8}$ inch in diameter, and would probably contain about five or six cells each. These excavations have all been worked upwards, so that all dust or raspings would be easily removed. One tunnel has a branch one commenced, which is about two inches in length; the number of cells intended to occupy a tube is marked by a slight contraction of the diameter at the length of each. This interesting specimen of insect-labour is confirmatory of my opinion, based on the observation of the habits of our native wood-boring bees, and proves, in my opinion, that Reaumur drew upon his imagination when he penned the account of the development of *Xylocopa violacea*. Let each one, therefore, who would avoid error, study the pages of the book of Nature—the book of truth; records from these will live in the memories of succeeding generations. Trust not to the imagination, however plausible the reasoning may appear—however certain results may apparently be calculated upon. The means whereby Nature arrives at her perfection of things are infinite in variety, in wisdom unlimited, and offering to every one an inexhaustible amount of enjoyment and instruction.—
Frederick Smith; Richmond Crescent, Islington, N.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

Anniversary Meeting, January 24, 1859.—Dr. GRAY, President, in the chair.

Messrs. J. Lubbock, E. Sheppard, H. T. Stainton and G. R. Waterhouse were elected Members of the Council, in the room of Messrs. F. Bond, W. W. Saunders, J. T. Syme and J. O. Westwood. Dr. J. E. Gray was re-elected President; S. Stevens, Esq., Treasurer; and Messrs. E. Shepherd and E. W. Janson, Secretaries.

The Report of the Library and Cabinet Committee and the Treasurer's accounts were read and received; the latter showed a balance in favour of the Society of £266 13s. 2d.

The President delivered an Address on the affairs of the Society, and the general progress of Entomology, for which the meeting passed a cordial vote of thanks, and ordered it to be printed.

February 7, 1859.—Dr. GRAY, President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘An accentuated List of the British Lepidoptera, with hints on the derivation of the names,’ published and presented by the Entomological Societies of Oxford and Cambridge. ‘List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,’ by Francis Walker, F.L.S., &c., Part xvi., Deltoides; by the Author. ‘Journal of the Proceedings of the Linnean Society,’ vol. iii. No. 2; by the Society. ‘The Zoologist’ for February; by the Editor. ‘The Journal of the Society of Arts’ for January; by the Society. ‘The Literary Gazette’ for January; by the Editor. ‘The Athenæum’ for January; by the Editor. ‘A Manual of British Butterflies and Moths, No. 25;’ ‘The Entomologist’s Weekly Intelligencer,’ Nos. 119—122; by H. T. Stainton, Esq. ‘Proceedings of the Berwickshire Naturalists’ Club,’ vol. iv. No. 2; by the Club. ‘Catalogue of Hispidæ in the Collection of the British Museum,’ by Joseph S. Baly, M.E.S., &c., Part I.; by the Author. ‘Stettiner Entomologische Zeitung,’ Nos. 10—12, for 1858; by the Entomological Society of Stettin.

Nomination of Vice-Presidents.

The President nominated Messrs. F. Smith, H. T. Stainton and G. R. Waterhouse Vice-Presidents for the year.

Election of a Member.

Godfrey Howitt, Esq., M.D. of Melbourne, Victoria, was balloted for and elected a Member of the Society.

Exhibitions.

Mr. Stevens exhibited a box of insects received from Mr. Bates, containing a beautiful series of Micro-Lepidoptera from the Upper Amazon; and some fine Coleoptera taken by Mr. A. R. Wallace in Amboina, amongst which were *Euchirus longimanus*, some new and beautiful species of *Buprestidæ* and *Anthribidæ*, a magnificent new species of *Batocera*, and a fine *Prionus* also new to Science.

Mr. Pascoe has furnished the following diagnoses of two fine longicorns in this Collection:—

Monohammus Grayii. *M. aterrimus*; prothorace antice, elytrisque fasciis quatuor, et macula basali hirtis, ochraceis, his chalybeo-atris, nitidis, parce punctatis. Long. 13 lin.

Dixi in hon. J. E. Gray, Ph.D., Ent. Soc. Lond. Præses., &c., &c.

Agnia fasciata.—*A. aterrima*; elytris parce punctatis, fasciis quatuor hirtis, ochraceis. Long. 9 lin.

Precedenti facie simillima, sed *Agnia*, Newm., genus bene distinctum, pertinet.

Mr. Janson exhibited a series of *Symbiotes latus*, *Redtenbacher* [Faun. Austr. 1st ed. 198, 184 (1849), 2nd ed. 371, 382 (1857), *Gerstaecker*, Mon. Endom. 400, 1 (1858)] illustrating the variations in size and colour to which this species is subject. These specimens were captured by himself, within the London district, on the 30th of June, 14th of July, and on the 8th and 29th of August, 1858, and, as previously stated, in localities upwards of a mile apart. He remarked that he had experienced no difficulty

in determining, within a few hours of first meeting with this insect, the genus to which it pertained. The analytical method pursued by Dr. Redtenbacher, in his admirable work above cited, and the clearness and precision of his generic characters, affording peculiar facilities to the student; but having advanced thus far, *safe* progress was interdicted, for, although Dr. Redtenbacher's description of *S. latus* satisfactorily applied, in most respects, to the insect before the Meeting, two, apparently important, discrepancies presented themselves, namely, that of his *S. latus* the author distinctly says that the thorax has "the upper surface *smooth, shining, not punctured*," and "the interstices between the striæ of the elytra *not punctured*," whereas, in all the individuals of the insect under consideration, the prothorax is conspicuously, although minutely and sparsely, punctured, and the interstices of the elytral striæ present numerous irregularly disposed punctures, very evident throughout the basal moiety, but obsolete on the apical half. Under these circumstances, he had considered it right to defer bringing the insect before the Society until he had ascertained its legitimate appellation, for which purpose he had intended to transmit specimens to Vienna on the first opportunity which should present itself. In the meanwhile, however, Dr. Gerstaecker's valuable 'Monographie der Familie Endomychidæ,' Berlin, 1858, came to hand, in which the genus *Symbiotes* is treated, and the species fully described, and at once all doubt as to the identity of our insect and *S. latus*, *Redt.*, was dispelled. As the present insect so closely resembles in its facies the common *Mycetæa hirta*, *Marsh., Steph.*, that it may be very pardonably confounded with it (its usually larger size and more parallel elytra might perhaps betray it), the following comparison of the characters of the two nearly allied genera, jotted down some months back for a friend, may prove acceptable to English students:—

MYCETÆA.

Antennæ. With the first joint of the triarticulate club very little wider than the preceding (8th).

Labrum. Transverse, truncate.

Maxillæ. With the two lobes nearly equal in length.

Max. Palpi. With the apical joint elongate-ovate, acuminate.

Lab. Palpi. With the second and third joints nearly equal in width.

SYMBIOTES.

With the first joint of the triarticulate club conspicuously wider than the preceding (8th), very nearly as wide as the succeeding (10th).

Transverse, slightly emarginate.

With the inner lobe very short and narrow

With the apical joint ovate obliquely truncate.

With the third joint much wider than the second (penultimate), globose.

Mr. Smith exhibited the nest of a species of *Larradæ*, and that of *Sphex Lanierii*, *Guérin*, and read the following.—

Observations on two Species of Fossorial Hymenoptera which construct exterior Nests.

"The varied economy of the fossorial division of the aculeate Hymenoptera, equals, if it does not exceed, that of the Mellifera. The name proposed by Mr. Westwood for the former division, "*Insectivora*," is by far the most characteristic, since all the fossors provision their nests with other insects. As far as my knowledge of the habits of the British species enables me to judge, I believe the majority to be fossorial; some,

however, burrow in wood, whilst others avail themselves of ready-formed burrows, &c., adapted to their purposes, never, as far as I have observed, forming tunnels or receptacles for their cells: this appears to be the habit of the species of the Genera *Sapyga* and *Pemphredon*.

"Our knowledge of the economy of Exotic species is very limited; I have had the pleasure of bringing before the Society some very interesting observations, made by M. Guenzius at Port Natal, upon various species of Hymenoptera, some belonging to the fossorial division. Mr. Bates has also contributed occasional notices of the habits of various species of these insects. In a collection lately received from the latter gentleman, a nest with the insect which constructed it was received, than which nothing could be more at variance with our preconceived ideas of the habits of the genus to which it belongs: the insect is a species of *Larrada*; the nest is composed apparently, as Mr. Bates suggests, of the escrapings of the woolly texture of plants; it is attached to a leaf, having a close resemblance to a piece of German tinder or a piece of sponge. With the first nest of this description forwarded by Mr. Bates was received a note, to the effect that he saw the insect issue from it, and he supposed it to be the builder; a second nest has, however, been received with the information that he had now no doubt of the nest being constructed by the *Larrada*, as he had observed it repeatedly busy in its construction. I have raised the nest from the leaf, and found four or five pupa-cases of a dark brown, thin, brittle consistency.

"I am not aware of any similar habit of building an external nest having been previously recorded; our British species of the closely-allied genus *Tachytes*, are burrowers in the ground, particularly in sandy situations; their anterior tarsi are strongly ciliated, the claws bifid and admirably adapted for burrowing. On examining the insect which constructed the nest now exhibited, I find the legs differently armed; the anterior pair are not ciliated, and the claws are simple and slender, clearly indicative of a peculiar habit, differing from its congeners, and how admirably is this illustrated in the nest before us.

"Another nest, also sent by Mr. Bates from Ega, is equally interesting; it is that of a species of *Sphex*, I believe the *Sphex Lanierii* of Guérin: this is constructed of a cottony substance, which fills a tunnel formed by a large curled leaf. Here we have another instance of economy at variance with our preconceived notions of the habits of the genus; we have hitherto regarded the species as being pre-eminently fossorial, and upon examining a large number of individuals I find they have the anterior tarsi very strongly ciliated, and all the tibiae strongly spinose. On examining the *Sphex* which constructed the nest in the rolled leaf, the anterior tarsi are found to be very slightly ciliated, and the tibiae almost destitute of spines, thus affording another instance proving that difference of structure is indicative of difference of habit."

Mr. Tompkins exhibited three species of *Psychidæ* hitherto unrecorded as British, viz.:—*P. roboricolella*, *Bruand*, bred June 26, 1858; *P. salicolella*, *Bruand*, bred June 23, 1858; *P. tabulella*, *Bruand*, taken July 24, 1854 flying about beeches at Mickleham; the names were determined from *Bruand's* Monograph of the family.

Mr. Stainton exhibited specimens of the coloured plates which were intended to illustrate Mr. Logan's projected work on the Lepidoptera of Scotland, on which the transformations of the following species were beautifully delineated, viz.:—*Polyommatus Artaxerxes*, *Agrotis lucerneæ*, *Lampronia rubiella*, *L. quadripunctella* and *Lozotania costana*.

Mr. Westwood exhibited the larva of *Anobium striatum* commonly known as the "bookworm," and a living larva of *Phlogophora meticulosa*, found feeding on southern-wood, which he considered a very extraordinary food-plant for the insect.

Entomology of the Cape of Good Hope.

Mr. Adam White read the following extracts from a letter addressed to him by R. Trimen, Esq., dated Knysna, Cape of Good Hope, November 15, 1858:—

"My experience in this part of the world since last July tends to show that the entomologist in South Africa must not expect an abundance of active insect life; as yet I have not in any place seen as many insects congregated and visible at one time as in the woods of England in June or July. As far as the *Lepidoptera* are concerned, I have found it hitherto almost impossible to discover the metropolis of any species; with the exception of some common *Pieridæ* and *Hipparchiæ*, which are to be found everywhere, the butterflies appear to be scarce. In this district the entomologist requires a great deal of patience, for the nature of the woods—with their rotting stumps, fallen logs, stones and immense variety of thorns—renders chasing insects an impossibility, and the only way is to stand quietly in some sunny nook, and catch them as they successively visit the spot. The following will show you the respective proportions of the several genera of butterflies, as far as I have been able to obtain them, up to this time, and as well as I can make out the number of species:—

<i>Papilio</i>	3	<i>Euplœa</i>	1
<i>Colias</i>	1	<i>Acræa</i>	2
<i>Pieris</i>	3	<i>Polyommatus</i>	8
<i>Anthocharis</i>	1	<i>Chrysophanus</i>	1
<i>Erebia</i>	3	<i>Zeutis</i>	7
<i>Mycæalis</i> (?)	1	<i>Thymele</i>	2
<i>Euryteia</i>	1	<i>Steropes</i>	2
<i>Cynthia</i>	1	<i>Pamphila</i>	2
<i>Philognomes</i>	1	——— ?	2
<i>Salamis</i>	1		

"Of moths I have upwards of 120 species, of which *Geometra* and *Pyrales* form the greater proportion; of *Sphingidæ* I have but five species, one *Syntomis*, two *Anthrocera*, one *Smerinthus* and one *Trochilium*. Sugar does not seem to succeed here in attracting them; I sugared twice without the least success, and the third time only found two moths, on sugared flowers. Light succeeds well on certain nights, and I have obtained a good many in that way.

"November 19. It has been very warm all the week and insects are visibly increasing in numbers every day. I have taken another *Anthocharis* (I think *Danaë*), *Danaë* *Chrysippus*, a beautiful *Zygæna*, intermediate between *Proeris* and *Syntomis*, &c.

"My collection of beetles comprises about ninety species of larger size and a good number of small species. The *Lamellicorns* constitute the most numerous section of the *Coleoptera* here, and many of the species are very curious and striking in their appearance. The whole district is overrun by numbers of juvenile green and black locusts, which hang in hundreds on the shrubs and plants, and strip them of their leaves and young shoots in a very short time. The day before yesterday I saw a

Bittacus (of a species very common here) carrying a large fly along by one of its hind tarsi: the fly had evidently been abstracted from a spider's web, as it was wrapped in a webby shroud.

"It is worthy of remark how few species of Lepidopterous larva I can find; I imagine the greater number of them must feed at night, or high up on the trees.

"December 5.—I am going to-morrow to some large woods near at hand to endeavour to obtain some wondrous butterflies I have been informed of; they have, according to my informant (an observant old farmer), 'hard wings' which 'snap' when they fly; they keep entirely within the forests, and are found sucking the sap from the *Polygalæ* that grow there: I thought of *Cicadæ*, and suggested them to my informant, but he knew the latter well, and insisted that those he meant were butterflies; and that there were several kinds, all large, and one with two tails on each hind wing. The only one I have in my descriptions as possessing two tails on each wing is *Charaxes Xiphæus*; it is probably that species.

"December 13.—I have been out to-day in the woods, from 8 A. M. to 3 P. M., but although I visited the express woods mentioned by my informant, I saw nothing of the 'snap-wing' butterflies he described; indeed, though a splendid hot day, I saw very little in the insect way in the forest itself, though near it I captured a large and beautiful *Trochilium*, which must, I think, be quite new to Science, and some fine specimens of *Danaïs Chrysippus*."

Mr. White observed that no doubt the snapping sound alluded to was similar to that produced by the *Ageronæ*.

Mr. Waterhouse read a paper entitled "Notes on the British species of *Heteroceras*."

The President announced that the Council had resolved that all Members and Subscribers, whether residents in London or otherwise, shall in future be entitled to receive the Transactions of the Society gratuitously.—E. S.

The Tendency of Species to form Varieties.—Of the papers upon this subject which have appeared in the '*Zoologist*' (*Zool.* 6293—6308), those of Mr. Darwin seem to extend the operation of his theory into a period resembling geological epochs, which carries us at once into the region of conjecture,—a "barren ground," upon the boundless wastes of which I have no inclination to wander. If, however, Mr. Darwin's hypothesis supposes perceptible changes, and embraces the time present, it is submitted that the following observations may be not unworthy of attention in reference to his reasoning, and I would suggest for consideration whether the views (concluding the meaning of both writers to be essentially the same) propounded in the papers alluded to above are not founded upon the imaginary probable, rather than obtained by induction from ascertained facts, which last process I do not hesitate to pronounce the only solid and satisfactory basis of a new opinion. As (the italics are his own) Mr. Wallace writes (*Zool.* 6305), of "*progression and continual divergence*, deduced from the general laws which regulate the existence of animals in a state of nature," he argues (if I understand him correctly) that the production of varieties is of constant occurrence; and, according to his position (*Zool.* 6304), that "the variety would

replace the *species*," the several races of animals familiarly known to us now must differ materially from those with which mankind were originally acquainted. But is this the fact? Comparing the oldest extant descriptions with any existing organisms (inanimate as well as animate may be included) which we can identify, is there any appreciable difference between the forms now before us and what are represented to us as the earlier types? I fancy I can anticipate the reply. Again; Mr. Wallace speaks (Zool. 6305) of "the undisputed fact that varieties do frequently occur." No doubt "freaks of nature" do occasionally happen in respect to individual wild animals, but how far they are perpetuated is very questionable. If Mr. Wallace's theory is sound, we ought to find in some part or other of this country colonies of white rooks, white blackbirds, &c.; whereas we may challenge the reference to any example of such departures from the normal configuration becoming permanent. Mr. Wallace appears (Zool. 6304) to regard a casual instance of improved physical powers as the regular variation from the original type of an animal; on the contrary, I conceive the rule to be that the variation usually consists in a deficiency of those powers. I by no means deny that among all races of organized beings some individuals may and do possess a superiority in development over their congeners in general, but I do contend that in a state of nature this superiority is not demonstrably continued in successive generations; indeed I will declare my opinion, that, in the wild state, after a very few generations at the utmost, any accidental variation, whether apparently favourable or unfavourable, will be merged in a return to that original condition in which the creature was from the first adapted to the situation in which it was placed. Analogously we may reason from the case of mankind: our own experience must inform us, that monstrosities are not of very rare occurrence in the world, but it will not be argued that these examples have possessed any general influence upon the average standard dimensions of the human race. Reversely I believe it has been expressly noted, that the progeny, if any, of either giants or dwarfs did not prominently exhibit the peculiarities of the parents. I am not aware that the King of Prussia, who showed such a mania for collecting tall men for enlisting in his guards, succeeded in establishing a breed of giants in his dominions, although it is, I think, recorded that Frederick was by no means scrupulous as to his measures for providing his extra-grenadiers with proportionally tall wives.—Arthur Hussey; Rottingdean, February, 1859.

Notice of the Various Species of Bovine Animals. By the Editor of the 'Indian Field.'

(Continued from p. 6429.)

THE third or flat-horned group of taurines is distinguished as the name imports, the horns having an oval section, at least towards the base. As far as we know, the type is exclusively Asiatic; and however the details of structure may vary, the species have certain characters in common. A short smooth coat, either black or of an earthy brown colour verging more or less on black, at least in the bulls, and white *stockings* from the mid-joint (inclusive) downwards; as may

be commonly enough seen in the Indian buffalo, of the bubaline series, regular forest animals, that browse more or less, the gayal especially being much given to crop the leaves of trees and shrubs, while the gaour is more of a grazer. Very gentle creatures, where not persecuted; and most readily tamed; inhabiting the upland forests of tropical and juxta-tropical Asia, where they pasture in the more open glades; and assimilating in their general habits to other taurines, and in no respect to the buffalos, though the gayal is very bubaline in figure and proportions. Three species are now well known and thoroughly established, and a fourth less satisfactorily—if it really constitute a fourth, which may be doubted; but the balance of evidence is in favour of its being a distinct species from the banteng of the Archipelago, however nearly akin.

The names *Bibos* and *Gavæus* have been proposed for the group; or rather the former has immediate reference to the gaour in particular, which is especially characterized by its high spinal ridge.

The gaour (*Bos gaurus*, Col. Ham. Smith; *B. gour*, Traill; *B. aculeatus*, Wagler; *Bibos cavifrons*, Hodgson; *B. asseel*, Horsfield (founded on the head of a cow in the India House Museum); *Gauri Gau* or *Gaur*, Nipal (Hodgson); *Jungli Khoolga*, Dukhani; *Kar Kona*, Kanarese, and *Gaviya*, Mahratta (Elliot); *As'l Gayal* of the Hindus in Chittagong, and *Seloi* of the Kukis (Macrae); *Gayal* of Cuttak sportsmen; *Pyoung* of Burmese (Phayre); *Sapi utan* (literally "wild cow") of the Malays of the peninsula.

"It is somewhat remarkable," observed the Hon. Walter Elliot in 1839, "that one of the largest animals of the Indian Fauna, frequenting all the extensive forest-tracts from Cape Comorin to the Himilayas, should only have been indicated distinctly within the last two years. I have seen specimens from Tinivelli, and likewise from the whole range of the Syhadri mountains, up to Mahableshwa, and I know that the animal has been killed near Vellore, in the Shirwaroya hills near Salem, at Asirgurh, in Kandesh, Rajamundri, and I doubt not that it will likewise be found in all the deeper recesses of the Eastern Ghats, and on the banks of all the great rivers passing through them. An imperfect cranium, which seems to belong to a female of the species, in the United Service Museum, is labelled thus,—“Head of a Bison from Keddah, Straits of Malacca.” We happen to have drawings of the specimen referred to, and have published copies of them, showing the skull in three aspects of view, in the ‘Asiatic Society’s Journal,’ vol. xi. p. 470; from which it will be seen that the species is quite

different from the gaour, and we take it to be the skull of a bull (divested of its horns) of the Burmese T'sain or T'soing, from the Keddah coast.

But the gaour is nevertheless plentiful in the Burmese countries, and all down the Malayan peninsula;* and since we last treated of the bovines, we happen to have obtained possession of a fine healthy yearling bull-calf of the species, who is just now quietly chewing the cud within a dozen yards of where we are writing, brought (together with a Malayan tapir) from Singapore,—as gentle and tractable a little fellow (little in comparison with the full-grown beast, not otherwise), as can be imagined, albeit full of life and friskiness occasionally, that will have started on his voyage to England before this notice meets the eyes of our readers, who may look out for a sketch of him ere long in the 'Illustrated London News.'

The gaour is about the largest of existing bovines, a fine bull standing fully 19 hands from the summit of his elevated spinal ridge,† with a huge ponderous body, longish limbs, little trace of dewlap, a broad head, with high upturned frontal ridge occasioning a hollowness of the wide forehead, and a thorough Roman nose; eyes full and lustrous; the ears rather large; tail scarcely reaching to the hocks; and the horns of the bull out with rather a backward curvature, and passing round inwards at the tips, with commonly a slight inclination backwards at the extreme tips, which in general is much stronger in the cows,—excepting in this respect, some cow-horns differ little from those of the bull, save in being much smaller; but others we have seen, more slender, and curving very much backward at the tips, as com-

* What was Aristotle's wild bull of Persia with depressed horns? The extinct Guavera of Ceylon, noticed by Knox, refers clearly to the species now under consideration. A correspondent of the old 'Bengal Sporting Magazine' (for 1835, p. 217), writing from the southern Mahratta country, remarks that "the 'bison' of this jungle differ materially from those of the Mahableshwa Hills. The latter is merely a blue cow, of the colour of a buffalo, but of large size. The regular 'bison' of Dandelly is a tremendous animal, the highest point being the shoulder." We have little faith in any such distinction; and merely suppose that the writer had seen a big bull in one locality, and not in the other.

† In the 'India Sporting Review,' new series, No. III. p. 329, we read of "a most splendid fellow covered with scars from fighting, his teeth gone from age, and most magnificent horns. He measured 20 hands 1½ inch without measuring his hoof." In the same periodical, No. V. p. 210, "a splendid fellow" is mentioned, who "measured 20 hands and 2½ inches. His horns," remarks the writer, "were the finest I have ever seen, either of my own shooting, or any one else's." In the preceding page "a fine young bull" is mentioned, "measuring 18½ hands at the shoulder; horns not very large."

monly in the cow banteng; and upon such a specimen (of which—the actual individual—we possess figures) is founded the *Bos asseel* of the much respected veteran zoologist Dr. Horsfield. The finest head of a bull we ever saw, of several dozens, we purchased some time ago at a Calcutta auction for one rupee, it being put up as a buffalo skull; and this remarkably fine specimen is now in the Calcutta Museum.

The horns upon it are beautifully symmetrical; and—what is unusual in first-rate gaour-skulls—they are not broken away at the tips, the result, we may suppose, of the combats of these gigantic animals. Round the outside curvature they measure each 30 inches, circumference at the base $14\frac{1}{2}$ inches, 6 inches in horizontal diameter across the base, greatest width apart 3 feet (measuring from the outside), tips 21 inches apart, distance apart posteriorly at base $8\frac{1}{2}$ inches; from forehead to tip of nasal bones 19 inches; the intermaxillaries reaching 3 inches further; breadth of orbits apart posteriorly, $11\frac{3}{8}$ inches. Weight of the skull with horns, minus the lower jaw, just 30 lbs. Skull extraordinarily massive. The horns are much flattened as far as the outward curvature continues, rounder where the tips hook inward, and are of a pale greenish glaucous hue, with black tips; and for nearly the basal half they exhibit a series of bold transverse rugæ. The colour of the beast is brown, passing more or less to black, with whitish fulvescent *stockings* to the four limbs, and the same pale hue on the somewhat lengthened hair of the forehead, and on that lining the ears; the cows running generally paler. According to Mr. Hodgson, the rugous bases of the horns “are furnished posteally with a fragrant secretion.”

He was a fine fellow who originally owned the above head-piece. There is also a perfect skeleton of a very respectable bull, and another of a cow, in the museum of the Asiatic Society, Calcutta; together with a stuffed bull, which was in tolerable proportions when first set up, but the great weight and contraction of the skin in drying have spoiled the shape altogether.

The most remarkable feature of the gaour is its high spinal ridge, the apophyses of the longest vertebræ measuring 16 inches in length; the dorsal line of them slopes back a little, and then terminates with a remarkable abruptness, which is observed in a less striking degree also in the gayal. In our living gaour-calf, this character is less prominent than might be expected, and the head is much less broad, and is

* Vide figure in the ‘Journal of the Asiatic Society,’ vol. vi. p. 748.

remarkably deer-like; the ears too seem proportionally large, and the legs are conspicuously longer than in a gayal-calf of the same age. In other respects there is considerable resemblance between the two species at this early period of life, and notably in the colouring; but the voice is strikingly different. That of the gayal, which we have often heard, is a prolonged, strange, somewhat shrill metallic cry, as if blown through a horn. Our young gaour's voice, which we suspect is pretty much that of the adult, is an equally prolonged, full, sonorous, and not unplaintive *hoo*, of considerable volume and most peculiar in tone, not to be forgotten when once heard, and which carries one at once in imagination to the jungles; in general likewise this is more or less modulated, and not unfrequently it has almost a human expression of languor and *ennui*. "The voice of the gauri," remarks Mr. Hodgson, "is very peculiar and quite unlike that of the ox, buffalo or bison; but as I am not skilled in bestial languages, I shall not attempt to syllable this utterance."

There is doubtless a difference in the voices of the two sexes, at least when adult; just as White of Selborne remarks of those of European cattle. "Oxen," he observes, "have large bent horns, and hoarse [deep] voices when they low, like cows, for bulls have short, straight horns; and though they mutter and grumble in a deep tremendous tone, yet they low in a shrill high key." How different this from the gruff cough or grunt of the humped bull! One remarkable particular connected with our juvenile gaour is the extreme fragrance of his breath, which is noticeable sometimes at several yards distance; it is that of European cattle intensified, and still sweeter; and we have never remarked this peculiar fragrance in the breath of the humped cattle. That of the gaour is really an exquisite perfume. It may be that we have not chanced to notice the same in the gayal.

Of this species in the sub-Himalayan region, Mr. Hodgson remarks:—"The Gauri Gau never quits the deepest recesses of the sal-forest, avoiding wholly the proximate *tarai* on one side, and the hills on the other. It is gregarious in herds of from ten to thirty, the females much preponderating over the males in the herds, though even in a small herd there are usually two or three grown males, whose conjoint office it is to guide and guard the party. This office is discharged with uncommon alertness, proving the animal to possess great perfection in all the senses, and with indomitable courage too, if need be; so that neither tiger, rhinoceros nor elephant dare molest the herd.*

* We have read of a big gaour-bull being killed by a tiger, but taken no doubt at a disadvantage.

During the heat of the day the herd reposes in the deepest cover, coming forth at morn and eventides to feed in the small and open pastures interspersed throughout the forest. Here the animals spread, of necessity, in order to feed, but in moving to and fro from their pastures they advance in single file, along the narrow beats made by themselves, by elephants, samburs, and other large tenants of the solitary and seemingly impenetrable wilderness.

"On an elephant, and in the day-time, you may, if you show yourself distinctly, approach the herd with facility, and I have seen the males stand with a careless indifference within a few paces; probably because they fear not the wild elephant, and are never molested by sportsmen with the aid of the tame one, the *shastras* having decreed that the Gauri is like unto Bos. No gentleman of the country [Nipal] will attempt to kill the Gauri; and plebeians, if they have less tender consciences, have ordinarily no adequate appliances for the work." A mode of hunting these animals, by people of low caste, is however described; and the pertinacity of the gaour, in watching the tree into which his pursuer may have mounted for shelter, is especially noticed. "In cases in which the luckless climber has dropped his weapon, and his companions have feared to come presently to the rescue, the Gauri has been known to keep his station at the bottom of the tree for twenty-four hours, and it is believed would never have stirred from the spot, so long as the man was above, if the animal had not been eventually destroyed." Mr. Elliot, however, remarks that "the persevering ferocity of the 'bison' of the sub-Himalayan range, described by Mr. Hodgson, is quite foreign to the character of the animal in the southern forests. When wounded, it is true it charges its assailant with determined courage, and many instances have come to my knowledge of its doing so with fatal effect; but in general it will always seek its safety by flight, if permitted."

Mr. Elliot mentions different grasses and other plants upon which the gaours subsist, and adds that "they will eat with avidity every species of grain commonly cultivated on the hills or plains, as the ryots find to their cost. They are so particularly fond of the *Dolichos lablab*, when in blossom, that they will invade and destroy fields of it in open daylight, and despite any resistance the villagers can offer. In other respects it is a very inoffensive animal, very rarely attacking any one it encounters, except in the case of a single bull driven from the herd. Such a one has occasionally been known to take up his location in some deep bowery jungle, and deliberately quarter himself on the cultivation of the adjacent villages. The villagers, though ready to

assist Europeans in the slaughter of these animals, will not themselves destroy them (the inviolability of the cow extending to the gaour); and so bold does this free-booting animal become in consequence, that he has been known to drive the ryots from the fields, and deliberately devour the produce. But in general it is a timid animal, and it is often difficult to get within gun-shot of them.

"The breeding season is said to be early in the year, and the calves are born after the rains. The bulls are often found separate from the herd, which consists generally of from ten to fifteen cows and a bull. They generally feed during the night, browsing on the young grass and the tender shoots of the bamboos, of which they are very fond. In the morning they retire to some thicket of long grass, or young bamboos, where they lie down to ruminate. When disturbed, the first that perceives the intruder stamps loudly with its foot to alarm the rest, and the whole rush through the forest breaking down every obstacle and forcing their way with a terrific crash.

——— Dat euntibus ingens

Silva locum, et magno cedunt virgulta fragore.

Æneid, vii. 676.

"When suddenly approached in the night they start off with a loud hissing snort.

"The Gowálahs say that they see great numbers of gaour when pasturing their herds in the neighbouring forest. They describe them as very timid and watchful, more so than any other wild animal, always reposing in a circle, with their heads turned outside, ready to take alarm. They add that they see most calves from June to October, but the greatest number about August. They do not know how long the cow goes with calf, but suppose the period of gestation to be the same as that of the buffalo, or ten months and ten days. The old male drives the others from the herd at the breeding season, and the single ones seen in the jungle are young males of this description, and it is probable that the very old bulls are sometimes expelled also by younger and stronger males.

"For the following particulars derived from the observation of the animal in the Sherwaroya hills, I am indebted," continues Mr. Elliot, "to Mr. Fischer of Salem. 'The bison ordinarily frequent the hills, seeking the highest and coolest parts, but during the hottest weather, and when the hills are parched by the heat or the grass consumed by fire, the single families, in which they commonly range the hills, congregate into large herds, and strike deep into the great woods and

valleys; but after the first showers, and when verdure begins to re-appear, they again disperse and range about freely. In wet and windy weather they again resort to the valleys to escape its inclemency, and also to avoid a species of fly or gnat which harasses them greatly. In the months of July and August they regularly descend to the plains, for the purpose of licking the earth impregnated with natron or soda, which seems as essential to their well-doing as common salt is to the domestic animal when kept in hilly tracts.

“ ‘The period of gestation is with the gaour the same as with the domestic animal; they drop their young in the months of September and October. I once had one brought to me so young that the navel-string was still unseparated. I should think that it was then about the size of a common country cow’s calf of four months’ old. It seems a slow-growing animal. A calf I had for three years was evidently in every respect still a mere calf. They seem very difficult to rear. I have known it attempted at different ages, but never knew the animal live beyond the third year. Mr. Cockburn has tried it in vain, in its native climate, the Sherwaroya hills, and I have made the attempt at Salem repeatedly. At one time I had five in my farm-yard; one lived for three years; but this one, with all the others, died suddenly in the same week from some disease, marked by refusal of food, running from the nose, and an abominable stench from the mouth. A similar disease, it may be noted, prevailed (as I was informed) among the gaour of the Sherwaroya, Shandamungalam and Nilgiri hills. The calves I had never became in any degree domesticated: the domestic cow could never be induced to suckle them.’ ”

A more domestic-looking little beast than the gaour-calf just outside our window it would be difficult to imagine; and when an epidemic prevails over the country, as in the instance here noticed, it cannot but be regarded as altogether an exceptive case. The fact happens to be that the gaour, in addition to the gayal, is actually domesticated in the interior of the Tippera hills. Of this we are assured by the Rev. J. Barbe, a well-qualified observer, who to this day is (we believe) the only European who has penetrated into that little-known region. His verbal description left no doubt whatever on the subject; and in proof of his having correctly determined the species, as distinguished from the gayal, he presented a pair of veritable gaour-horns to the Calcutta Museum as those of one of the domesticated animals which he saw.

The Hon. Walter Elliot thus describes a fine Dandelly gaour which fell to his rifle. He had tumbled over a precipitous bank into a river,

and, "when drawn ashore and examined more minutely, the first sentiment produced in all present was astonishment at his immense bulk and size; but on measuring his height, we found him much taller than his breadth at first led us to imagine.

"The head is very square, and shorter than in the common ox; the forehead ample, the bony ridge rising about five inches in height from the plane of the frontal bone, over which it inclines. When viewed behind, it rises suddenly and abruptly from the nape of the neck, from whence to the vertex it measures 7 inches; the horns make a wide sweep in continuation of the arched bony ridge, and turn slightly backwards and upwards, forming an angle of about 35 inches with the frontal bone; the whole of the head in front, behind the eyes, is covered with a coat of close short hair, of a light grayish brown colour, which below the eyes is darker, approaching almost to black. The muzzle is large and full, of a grayish colour; the eyes are smaller than in the ox, with a fuller pupil of a pale blue colour; the ears are smaller in proportion than in the ox;* the tongue is very rough, and covered with prickles;† the neck is short, thick and heavy; the chest broad; the shoulder very deep and muscular; the fore legs short, the joints very short and strong; the arm exceedingly large and muscular. Behind the neck and immediately above the shoulder rises a fleshy gibbosity or hump‡ of the same height as the dorsal ridge, which is thinner and firmer, rising gradually as it goes backwards,§ and terminates suddenly about the middle of the back. The hind quarters are lighter and lower than the fore, falling suddenly from the termination of the ridge; the tail very short, its tuft only reaching down to the hocks.

* In our calf they are decidedly and conspicuously large; and in form are intermediate to the more lanceolate ears of the humped cattle, and the rounder ears of the European type; we observe, moreover, that his lips are white, and that he has a distinct dark spinal list continued alike over the ridge and behind it. Be it observed that this is a Malayan individual.

† In our young animal the tongue is moderately rough to the feel, and is of a pale bluish colour on its upper surface, carneous below: he readily licks the hand that is held out to him, which affords tolerable opportunity for observation.

‡ Mr. Hodgson, who annotated a reprint of Mr. Elliot's paper in the 'Asiatic Society's Journal,' vol. x. p. 579, puts a note of interrogation respecting this hump; but its presence in the specimen is distinctly and repeatedly noticed by Mr. Elliot.

§ "Quere forwards. The height of the true dorsal ridge declines from the third process of the vertebræ, and the general appearance of the ridge therefore is a declination, not a rise, towards the croup from the withers."—Hodgson. This is well shown in the skeleton.

"The dimensions of this individual were carefully noted as follows:—

	Feet.	Inches.
Height at the shoulder	6	1½
... at the rump, taken from hoof to insertion of tail	5	5
Length from nose to insertion of tail	9	6½
... of tail	2	10
... of dorsal ridge, including the hump	3	4
Height of dorsal ridge, including the hump	0	4½
Girth, taken behind the fore-legs	8	0
Breadth of the forehead	1	3½
From muzzle to top of arched bony ridge	2	1½
Length of ear	0	10½
Circumference of horn at base	1	7½ *
... of the arm	2	6

"The skin on the neck and shoulders and on the thighs is very thick, being about two inches in this one, which has already shrunk from lying in the sun. It is used for making shields, which are much prized.

"The cows differ from the male in having a slighter and more graceful head, slender neck, no hump, a less defined dewlap, and the tips of the horns do not turn towards each other at the points, but bend slightly backwards; the horns are smaller too, and the frontal bone narrower, but the coronal ridge is distinctly marked. The bulls have the forehead broader in proportion to their age. In the young bull it is narrower than in the cow, and the bony ridge scarcely perceptible. The horns, too, in the young specimen turn more upwards.

"The general colour is dark brown, the hair thick and short, but in old individuals the upper parts are often rather bare. That on the neck and breast and beneath is longer, and the skin of the throat is somewhat loose, giving the appearance of a slight dewlap. The legs are white, with a rufous tint on the back and side of the fore legs. The cow has the legs of a purer white. The skin of the under parts where uncovered is of a deep ochry yellow.

"I saw," continues Mr. Elliot, "a young gaour-calf in the possession of some Gowálahs, the owners of large herds of buffalos. It was caught when just dropped in the month of May, and when I saw it was seven months old, very tame and gentle, though timid, licking the hands of the Gowálahs, and frisking about with the buffalo calves. It was the same colour as the old animal, very dark brown, with white legs.

* Query, 1 foot 1½ inch.

The head small, the forehead wanting the breadth so remarkable in the adult, and the bony ridge of the crown was hardly perceptible. The horns were just beginning to sprout, the ears larger and rounder than those of the buffalo, the eyes a pale gray or cærulean colour. The hair on the throat was long, and the dewlap slightly indicated. No hump was perceptible, but the dorsal ridge was distinctly marked." Comparing this description with our living calf, it applies exactly; only our animal is rather older, with horns a moderate span in length; and we estimate his height at the dorsal ridge to be about $3\frac{1}{4}$ feet, or perhaps a trifle more. The great change which the skull undergoes in shape is extremely remarkable, and much affects the position of the orbits, which are placed considerably more backward in the young animal before it develops the extraordinary breadth of forehead. In the old gaour the orbits are remarkably prominent, and are situate very forward in the head; and there is much of corresponding change in the shape of the head also in the gayal, which species we next proceed to notice.

(To be continued.)

Reason and Instinct. By the REV. J. C. ATKINSON, M.A.

(Continued from p. 6441.)

WE have yet one step more, and higher, to take before we close our present investigation; and that is, from among the subject-creatures, to the human sovereign of creation. Touching the power, and place, and functions of Instinct in prompting human actions, our enquiries are too recent to need recapitulation here. Suffice it to repeat three out of the four main positions which we endeavoured to illustrate and make good in a former portion of the present essay (Zool. 6081 *et seq.*)

1. That man, in an uncivilized state, is the most influenced by the impulses of Instinct; so that in some of his actions that essence or attribute may predominate over Reason, as a practical rule of action; in an almost isolated action or two, may even operate to the exclusion of Reason.

2. That, presumably, as he emerges from the uncivilized state, Instinct, by degrees, ceases to have any predominant power, and, infancy past, in no case utterly excludes the operation of Reason.

3. That, in a fully-civilized state, Instinct survives indeed, but is

so restrained and regulated in its operation by Reason, that it becomes difficult to allege any but a very few of man's daily actions as influenced by it, or even to distinguish between the workings of Instinct and the rulings of Reason, in actions which, according to analogy, are originally due to or prompted by Instinct.

The statements and considerations by which we endeavoured to illustrate and establish these positions (Zool. 6083—6091, 6196—6206, 6313—6317) both give and receive mutual light and confirmation, when brought into contrast with similar physiological observations to those appealed to in the case of the lower animals. I do not mean that there are in existence any available observations—at least, so far as I am aware—upon the contrasted brains of uncivilized, semi- or imperfectly civilized, and civilized man,—any series, that is to say, intended to display the comparative conformation of each, and the relative magnitudes and conditions of development of the cerebral hemispheres, and the organs at the base of the brain which are the analogues of the Instinct-organs in the several classes of the brute creation; but, what is clearly approximating in value to such a series of observations, we have the shape and dimensions of the different skulls, and of the cranial cavity in each, which are to be met with among the different communities and tribes of mankind. And it is a sufficiently remarkable fact, that these skulls do arrange themselves in three great classes—distinguished as the Prognathous, Pyramidal and Elliptical type of skulls—corresponding precisely to the three divisions or classes of mankind which we indicated by the nomenclature adopted a moment since, and implied in our three positions; I mean uncivilized, imperfectly civilized and civilized; while the description, given by physiological writers, of each several class of skulls is equally remarkable, taken in connexion with the statements and considerations which were advanced when what we have called our “positions” were under discussion.

The *Prognathous Skull*, which is the prevailing cranial conformation among the most uncivilized or savage communities in the world, is remarkable, says Dr. Carpenter, “for the large development of the parts connected with the organs of sense, especially those of smell and hearing. The aperture of the nostrils is very wide, and the internal space allowed for the expansion of the Schneiderian membrane, and for the distribution of the olfactory nerve, is much greater than in most European heads. The posterior openings of the nasal cavity are not less remarkable for their width than the anterior. The external auditory meatus is also peculiarly wide and spacious, and the

orbital cavities have been thought to be of more than ordinary capacity."

The greater relative development of the zygomatic bones, and of the bones of the face altogether, when compared with the capacity of the cranium, indicates in the *Pyramidal Skull*, which is the type obtaining among peoples or tribes certainly most imperfectly civilized, a more ample extension of the organs subservient to sensation, the same effect being thus produced by lateral expansion as by the forward extension of the facial bones in the *Prognathous skulls*.

The principal features of the *Oval Skull*, found among all the civilized nations in the world, "are thus of a negative character: the chief positive distinction is the large development of the cranial cavity, and especially the fulness and elevation of the forehead in proportion to the size of the face; indicating the predominance of the intellectual powers over those *merely instinctive propensities which are more directly connected with sensations*." (Hum. Phys. p. 1075).

Thus, then, we have passed in review a very considerable portion of the entire scale of animated creation; and, almost throughout the whole of the gradations that have been brought under our notice, we have had occasion to observe, that corresponding with the progressive advances in cerebral development, are similar advances in instinctive and intelligent development. Instinct is not developed independently of Reason, nor Reason independently of Instinct, but both simultaneously and co-ordinately, though not by any means, possibly, in any similar or definite proportion. Further, we observe that, at some point near the upper end of the scale, Reason began to assert a dominant power, and that from thence its sway continued to increase ceaselessly and irresistibly, until, at last, it became difficult either to allege any actions as due to its undoubted influence, or even to distinguish its operation in actions which, according to strict analogy, ought to be induced by it.

It is, perhaps, scarcely necessary to advance anything in the way of set proof, that Instinct and Reason are, besides being developed simultaneously or co-ordinately, also developed co-operatively; for, indeed, it is self-evident that the intelligence of the creature—whatever one it may be that we take for the sake of example or illustration—is made to subserve the natural ends peculiar to it; or, in other words, the purposes for which it is endowed by the Creator with the mysterious gift of Instinct. The trout, which eschews the detected cheat of the fisherman's fly; the alligator, which endeavours to conceal his advance upon his prey beneath the water; the flycatcher,

which shelters its young from the fierce beams of the sun by the interposition of its own body and fluttering wings; the fox, which selects the apparently most frequented run at which to lie in ambush for the return of the hares from their feeding ground,—all, as well as every other actor in every conceivable instance of the kind, do what is done in furtherance of an object the pursuit of which is Instinct-prompted.*

I cannot but think that enough has now been alleged to serve as an additional confirmation of the theory advanced in a former page, that there is a necessary and self-existent connection between Instinct and Reason; so that where there is apparent Instinct, there is or may be also (in however small a degree) a Reasoning power, whether latent and perhaps undiscoverable in the present state of our knowledge, or brought out and developed.

I must crave space here, before we pass on to another but allied branch of our enquiry, for a few words in support of a former conclusion, which, though not prominently put forward in our later remarks, has certainly been implied and perhaps tacitly strengthened by almost all that has been said—I mean the conclusion, that the lower animals are partakers in Mind; intending by that, "that the mental principle in animals is of the same essence as that of human beings." (Zool. 5575).

* How far what I have advanced in the text holds true in respect of animals, which have been not only domesticated, but are in the habit of constant or considerable association with their master, may be open to question. For my own part I confess to a decided belief that in the dog,—not to mention other animals brought much into contact with man, and especially if purposely taught and kindly treated by him,—Reason ceases in great measure to be subservient to Instinct. The sportsman, who—as many a true sportsman does—makes a friend of his dog, has a thousand instances presented to him in which the creature's Instinct is as clearly made the servant of his Intelligence, as is his own pursuit—Instinct-prompted originally—facilitated by his powers of observation, comparison and reasoning. Certainly the same thing must be conceded in respect of such cases as exhibit one animal interposing in aid of another; *e. g.* a dog for a dog, a dog for a man, or for a horse, and the like; and there are multitudes of such cases on record. The elephants, two in the Eastern military service,—last mentioned in terms of no slight admiration by the 'Times' special correspondent ('Times,' of January 24th), and often before that by other writers,—in their separate and combined efforts for the extrication of guns sit fast in heavy sand, or other bad roads, afford another and very distinct evidence that their Reason is entirely unfettered by their Instinct. To enumerate other instances will, I fear, be only tedious, and I certainly think unnecessary. It is, at the least, equally unnecessary to say anything as to the relative positions occupied by Reason and Instinct in the human economy.

It is, perhaps, unnecessary to say, that in speaking of mind something quite distinct from any part of the material organization of the animal is intended; although we may and do hold that the mind works through, or by means of, a certain part of that organization—namely, the brain. And it may be observed, in passing (and in reference to allusions made a few lines above), that in whatever degree it is satisfactorily established, that the higher parts of the human brain are the organs through which the human intellect acts, in almost the same degree is the fact that brutes possess, at least, a modification of precisely the same organs, converted into a powerful argument in support of the belief that they too have a mind to act upon and through those organs; a mind, moreover, of the same nature with, and intended to act after, the manner of their great prototype.

But possessing a mind—even though it be but what Sydney Smith terms “fragments of soul and tatters of understanding”—it follows of necessity that they have a will also; not, indeed, a dominant, irresistible* will, such as is met with in the majority of the human species, but still sufficient for the purpose. And here, again, observation steps in, and supplies us with sufficient proof of the soundness of the inference; and this will, like the mind, is quite independent of the brain, as to or for its existence, though, of course, not so as regards its manifestation or exercise.

* Irresistible as compared with that which it is brought to bear on: I am aware that in saying what I do in the text I am advancing an opinion which, at the least, seems to be at variance with that expressed by Dr. Carpenter. “Notwithstanding the evidences of Rationality,” we find him saying, “which many of the lower animals present, and the manifestations which they display of emotions that are similar to our own, there is no ground to believe that they have any of that controlling power, from the will, namely, over their psychical operations, which we possess. On the contrary, all observation leads to the conclusion that they are under complete dominion of the ideas and emotions by which they are for the time possessed, and have no power either of repressing these by a forcible act of will, or of turning the attention by a like voluntary effort into another channel. So that they may, in this respect, be like the dreamer, the somnambule or the insane.” I certainly do think these remarks are not borne out by observation; nay, are indeed contradicted by it. The dog or the cat, which are taught, by thousands and tens of thousands, to retain their urine and their dung until they can obtain egress from the room or the house, surely exercise a measure of will in doing so; particularly as the functions in question are generally believed to be performed by animals without any particular consciousness of the act, if any at all. The trout that rises to the angler’s fly, but rendered suspicious by some unnatural appearance it detects, turns aside without taking it,—perhaps even darts off in evident alarm,—surely does so voluntarily, or by an effort of will. And innumerable other instances of the same sort are available.

Now, neither the weakness or comparative impotency of the will, nor the infinite variety of degrees in mental endowment, are any objection to our theory. We find parallels to both within the limits of the human species. Thus, to speak only of mental endowment: the variety, and the total distance between the first and lowest gradation of mind and the last or highest among men, is neither greater nor more startling than either the variety or the difference observable in passing from the lowest to the highest brute animal. For instance, compare Newton, not as Sir B. Brodie would do, with what he would have been if born an Australian savage, nor even with one of our London Bushmen,—but with many a member of not the lowest or utterly uneducated classes of modern life,—with one of those heavy, soulless, mindless labourers, whose features (caricatured as they are in ‘Punch’) are yet but too easily recognised as the features of a not scanty class among the labouring poor of this country;—and what a huge, almost fathomless, gulf there lies between them! Every one must have seen both children and adults, who seemed incapable of mental culture beyond the merest rudiments; to whom mental effort was intolerably laborious, and, at the upshot and close of it all, bore too strong a resemblance to the *Mons parturiens* of the fable. While, on the other hand, to many, intellectual exertion is a delight and a solace; to a few, here and there, knowledge, discovery, invention, seem to come as if by inspiration. The abyss between these extremes is deep, and beyond measure wide; and yet, on either side of it, stands the same human mind, working through different specimens of the same human brain, and testifying in itself and through itself—it may be with different degrees of energy, but with no other difference—to the being of the human soul. The question, “Why has God made man so?” is one we cannot answer. We cannot even make any real advance in the path towards answering it; any more than we can towards answering this other question, “Why, in such a sensible portion of the whole human race, no mental faculties whatever, or certainly, the closest approximation to none, are accorded or permitted to be exercised? or why, in such a considerable proportion again, the mental faculties actually bestowed at birth, and exercised through a given, perhaps a considerable, portion of life, should be withdrawn, or obscured by lunacy or raving madness?” The facts only are there; and startling, humbling facts they are.

Somewhat similar considerations, moreover, may be advanced with respect to the power of the will in the human race. Some there are of “iron will,” of irresistible powers of volition; others again, even

among civilized people, and in no small proportion either, whose "infirmity of purpose," "feebleness of will," "indecision of character," is so obvious and continually met with, as even to occasion phrases—the very ones I have used among them—to be stereotyped for the common purpose of expressing them; while among the uncivilized and semi-civilized tribes, the instability or infirmity of will is one of the chief hindrances in the way of permitting newly introduced processes and habits of civilization from becoming stable and capable of self-support (Zool. 6205).

Now, it certainly seems to me that the facts connected with the development of mind, and of the volitional faculty, in the several orders of Vertebrates, are rendered much more comprehensible by a recollection of such circumstances as those just mentioned, in connexion with the development of the same faculties among mankind. Taking these facts into dispassionate consideration, the objection that the lower animals can have no mind at all, because the manifestations of mind in their case are so slight, so comparatively imperceptible, when put in contrast with those seen in the dog or the monkey, seems to be almost as forceless and unreasonable as it would be to say that the most stolid clod in the country side, the most stupid dolt at the village school, are not endowed with intellectual faculties because they differ so greatly, in a mental point of view, from some distinguished ornament of the learned professions—so inconceivably from such almost superhuman intellects as Newton.

J. C. ATKINSON.

Danby Parsonage, Grosmont, York,
March, 1859.

Instinct of Birds.—It is quite pleasing to observe the instinct of birds in certain seasons: in December and January the missel thrush, or "storm cock," during the lulls between the storms, was frequently to be seen and heard, delighting us with his beautiful short chant. On the 28th of January,—a fine, calm, mild day,—I heard a lark sing part of his song, and he soared about half his accustomed height on the occasion: this is about a month or six weeks before the usual time, but was a true presage of the long mild weather which followed. Those sagacious birds, the rooks, also began building their nests a full fortnight before the usual time. The hedge accentor has been in full song for two months; and the first blackbird I noted in this neighbourhood opening his beautiful plaintive but chary song, was on Saturday, the 19th of February. Our splendid songster, the thrush, has been in uninterrupted song since the frost in November last.—*H. W. Newman; Cheltenham, March 9, 1859.*

Occurrence of the Great Ash-coloured Shrike (Lanius excubitor) in Banffshire.—A male specimen of the above species entered Drummair Castle about the middle of last

month (February), in an apparently exhausted state: a severe storm raged at the time; it died shortly afterwards, and was brought me for preservation. This is the first instance of the kind, so far as I am aware, in this county.—*Thomas Edward; Banff, March 7, 1859.*

Occurrence of a Variety of the Common Bunting (Emberiza miliaria) in Shetland.—A very beautiful and almost a yellow specimen of the above bird was killed on the island of Bressay, near Lerwick, Shetland, on the 8th of February, by Mr. John Kennedy, of Fisherie: it was seen for some days previously in company with linnets and sparrows. All the feathers of the tail are of a whitish yellow, except the second from each side, which are of the usual colour. There are also a few dark spots on the breast and wings, and one single brownish feather on the very crown of the head. In other respects the bird has all the appearance of a large or monster canary. The bill, legs, feet and claws are likewise yellow.—*Id.; March 10.*

Late Swallows.—On the 13th of November last I saw two swallows flying in this neighbourhood; one was evidently injured in the wing, and flew very awkwardly. The day was rather chill, although the sun shone brightly.—*Arthur Hensman; Spring Hill, Northampton, February 14, 1859.*

Sea Birds found Inland.—I have in my collection a beautiful specimen of Wilson's petrel, which was picked up dead in a meadow near the river Avon, November 2, 1849. A specimen of the common stormy petrel was also picked up dead in a neighbouring parish, about thirty years since. I presume these birds had been driven by storms so far inland, but not being able to obtain their natural food they died of starvation: we are at the least fifty miles from the sea. A labourer had found the specimen of Wilson's petrel, and brought it to his cottage, intending to bring it to me, but his wife persuaded him it was only a swift, and he threw it out in the road: another labourer passing by picked it up and argued to himself that a swift had not webbed feet, and so he brought it down to the Vicarage, and was rewarded for his pains. This anecdote shows how often rare specimens may be missed for lack of knowledge.—*G. S. Marsh; Vicarage, Sutton Benger, Chippenham, Wilts.*

Another Sea Serpent.—The 'Amsterdamsche Courant' of October 6, 1858, inserts the following letter from Captain L. Byl, of the Dutch bark 'Hendrik Ido Ambacht,' to the 'Jorn-Bode':—"Sailing in the South Atlantic, in 27° 27' N. lat. and 14° 51' E. long., we perceived on July the 9th, between twelve and one o'clock in the afternoon, a dangerous sea-monster, which during nine days constantly kept alongside of us to 37° 55' S. lat. and 42° 9' E. long. This animal was about 90 feet long and 25 to 30 feet broad, and, most of the time, it struck the ship with such a force as to make it vibrate. The monster blew much water, which spread an unpleasant stench over the deck. The captain, fearing lest the animal might disable the rudder, did his utmost to get rid of his fearful antagonist, but without success. After it had received more than a hundred musket-balls, a harpoon and a long iron bar, blood was seen to flow from various wounds, so that at last, from loss of strength, the monster could swim behind our vessel no longer, and we were delivered of it. By its violent blows against the copper the animal's skin had been damaged in several places."—*J. H. van Lennep; Zeyst.*

The Shower of Fish in the Valley of Aberdare.—Many of your readers might, perhaps, like to see the facts connected with this phenomenon. They will be better understood in the words of the principal witness, as taken down by me on the spot where it happened. This man's name is John Lewis, a sawyer in Messrs. Nixon and Co's yard. His evidence is as follows:—"On Wednesday, February 9, I was getting out a piece of timber for the purpose of setting it for the saw, when I was startled by something falling all over me—down my neck, on my head, and on my back. On putting my hand down my neck I was surprised to find they were little fish. By this time I saw the whole ground covered with them. I took off my hat, the brim of which was full of them. They were jumping all about. They covered the ground in a long strip of about 80 yards by 12, as we measured afterwards. That shed (pointing to a very large workshop) was covered with them, and the shoots were quite full of them. My mates and I might have gathered bucketsful of them, scraping with our hands. We did gather a great many, about a bucketful, and threw them into the rain-pool, where some of them now are. There were two showers, with an interval of about ten minutes, and each shower lasted about two minutes, or thereabouts. The time was 11 A.M. The morning up-train to Aberdare was just then passing. It was not blowing very hard, but uncommon wet; just about the same wind as there is to-day (blowing rather stiff), and it came from this quarter (pointing to the S. of W). They came down with the rain in 'a body like.' " Such is the evidence. I have taken it for the purpose of being laid before Professor Owen, to whom, also, I shall send tomorrow, at the request of a friend of his, eighteen or twenty of the little fish. Three of them are large and very stout, measuring about four inches. The rest are small. There were some—but they are since dead—fully five inches long. They are very lively. *John Griffith; Vicarage, Aberdare, March 8, 1859.*

[The newspapers for the last three weeks have repeated similar statements to this in a variety of forms. Will some of our correspondents enlighten us on the subject?—E. N].

Remarks on Arachnida, taken chiefly in Dorsetshire and Hampshire.

By the Rev. O. PICKARD-CAMBRIDGE, M.A.

I BEG to enclose a list of Arachnida, taken chiefly in the counties of Dorset and Hants, during the last six years. I have not made this order the particular object of search during all that time, but have merely "had my eyes open" for them, in my daily constitutionals, and whilst collecting Lepidoptera and other insects; and the great success I have met with will, I hope, induce others to open their eyes in the same way. The preservation of spiders has been fully detailed in former numbers of the 'Zoologist' by Mr. Meade; I will therefore only add my testimony to the almost complete success of his method of keeping them in corked tubes of spirits of wine, slightly diluted, for the smaller species. The usual plan in collecting spiders is, to put them at once, indiscriminately, into a phial of spirits (carried in the pocket for the purpose) as soon as caught; and this kills them in

a few minutes. But, for myself, I prefer having a pocketful of small pill-boxes, and in these taking home the specimens alive for examination before immersion; for the spirit sometimes gives a different cast to the colours: a drop of chloroform renders the specimen quite quiet for examination with a magnifying glass, and then if wanted for the cabinet it is put into a tube, the tube filled with spirit and corked, and the whole ceremony is done; while, if the specimen is not wanted, it can be set free without any injury to itself. A small phial of spirit should, however, always be carried in the pocket, for spiders come across one at the most unlikely times; and it is very annoying to twist up a rare species in a piece of paper, and then to sit on it accidentally; and very unpleasant to pin the paper cocoon in your hat, and have the "uncanny beastie" get loose and crawl among your hair—both of which occurrences have several times happened to me.

Class ARACHNIDA.

Order ARANEIDEA.—Tribe OCTONOCULINA.

Family MYGALIDÆ.

Atypus Sulzeri. A male adult taken in January, 1857, by my brother, while ferretting in a rabbit's earth at Bloxworth, Dorset; and another by one of my sisters in August, 1857, crossing the high road not far from where the first was taken. Up to this time, the male of this species had never been captured in Great Britain. Long silken tubes, which I believe must be the nests of this species, are very common at Portland, near Pennsylvania Castle; but though I have dug many of them out entire, I could never discover the tenant either at home or abroad.

Family LYCOSIDÆ.

Lycosa agretyca. Lyndhurst, Hants, and Bloxworth.

L. campestris. Freshwater, Isle of Wight; also near Bath, and at Bloxworth.

L. andrenivora. Common on heaths in the south of England generally, and at Bloxworth especially; also at Portland, but not so common.

L. rapax. Lyndhurst, Bloxworth, and Portland.

L. picta. Common on Bloxworth Heath in old gravel pits; less frequent at Lyndhurst; very numerous on Sandy Flat, by Chesil Bank, Portland.

L. saccata. Common at Bloxworth, Lyndhurst, and Hatch Beauchamp, Somerset.

L. lugubris. Lyndhurst and Bloxworth.

L. herbigrada. This species was discovered by myself at Bloxworth and Portland in 1854, and named and described by Mr. Blackwall in the 'Annals of Natural History' in 1857; since then I have found it plentiful, both at Bloxworth and Lyndhurst; and also on the Sand Hills at Southport, Lancashire, in June, 1858.

L. obscura. Bloxworth.

L. exigua. Common at Bloxworth and Lyndhurst; also at Durham.

L. cambrica. This rare species I have taken three times—twice on Bloxworth Heath, and once on Lyndhurst Heath in 1858.

L. piratica. Bloxworth; rare.

Dolomedes mirabilis. Common at Bloxworth, Lyndhurst, and Hatch Beauchamp.

D. ornatus. This species was discovered by myself, in a rushy swamp on Lyndhurst Heath, in September, 1858; and it has been lately named and described in the 'Annals of Natural History' by Mr. Blackwall; all the specimens were immature.

D. fimbriatus. Common in rushy, boggy places on Bloxworth and Lyndhurst Heaths.

Sphasus lineatus. This (both genus and species new to Great Britain) was discovered by myself, in marshy places on Lyndhurst Heath, in August, 1858, but very rare.

Family SALTICIDÆ.

Salticus scenicus. Common on walls and posts at Bloxworth and Hatch Beauchamp, and also on the walls of University College, Durham.

S. sparsus. On palings at Lyndhurst; also at Bloxworth, but not common.

S. coronatus. Common at Bloxworth and Lyndhurst, beat from trees and bushes; also under stones at Portland; males are rare; an adult male beat from a fir near Ringwood, Hants, 1858.

S. frontalis. Not uncommon underneath stones near Pennsylvania Castle, Portland.

S. cupreus. Bloxworth and Portland.

Family THOMISIDÆ.

Thomisus brevipes. A single specimen on Lyndhurst Heath, in September, 1858.

T. cristatus. This very variable species is common everywhere.

T. sabulosus. This species, (though previously known on the Continent), was discovered by myself on Bloxworth Heath in 1854, and I have since taken it plentifully on Lyndhurst Heath; adults are scarce, especially males. This species is fond of sitting on the bare spots where turf has been cut, and where the small bits of gray mottled stone are strikingly like itself.

T. atomarius. A single specimen under dry cow-dung at Lyndhurst, August, 1858.

T. luctuosus. Bloxworth, August, 1857.

T. bifasciatus. I have taken this handsome species sparingly on Bloxworth Heath in the early spring.

T. Cambridgii. This species (a single adult female) was taken by myself on Bloxworth Heath, in September, 1857, and has been lately described in the 'Annals of Natural History' by Mr. Blackwall; who at the same time paid me the compliment of naming it after me. It is a large and handsome species, and showed very strikingly the habit (common, more or less, to all of this genus) of setting itself back and "showing fight" when the fingers were put near it.

T. citreus. Taken sparingly, at Bloxworth, from the blossoms of the common mullein and golden rod, in which it lies in wait to catch the insects that creep among them to suck the honey. I have known the female of this species overpower and kill a bee.

T. abbreviatus. Of this beautiful and delicately-coloured spider, a very young specimen was discovered by myself in one of my entomological collecting boxes at Bloxworth, in September, 1857; but during the last summer (1858) I have taken it freely on Lyndhurst Heath; previous to 1857, it was only known as an inhabitant of the South of France, Italy, Spain, and Africa. This species is of a singular shape, and sits with its two foremost legs slightly directed forwards, and both close together like one leg, and likewise the two hind legs similarly drawn backwards.

Philodromus dispar. Bloxworth; but rare.

P. pallidus. This species was discovered by myself in 1854, at Morden Park, near Bloxworth—or rather rediscovered, for in an old MS. of about the year 1714, lately lent me by James Salter, M.D., of Montague Street, London, and written by an ancestor of his, there is a very truthful coloured figure and description of this species. I have since taken it on Lyndhurst and Ringwood Heaths plentifully. The MS. referred to contains 145 figures and descriptions of about

100 species of British spiders, and most of the figures are beautifully drawn and coloured.

P. cespiticola. Common at Bloxworth.

P. aureolus. Bloxworth; but rare.

P. elegans. This strikingly marked species was discovered by myself at Lyndhurst, in August, 1858; and has been recently named and described by Mr. Blackwall in the 'Annals.' It appears to be a very local species, and, as far as I could ascertain, entirely confined to one spot on the Heath, where with a little trouble I could always find it.

P. oblongus. Sparingly taken at Lyndhurst, in August, 1858; but very plentifully at the base of grass stems on the sand-hills at Southport, Lancashire, in October, 1858. This species drops to the ground when disturbed, but quickly runs again up a grass mote, and, swinging itself round, sits almost hidden, by stretching its four foremost legs forwards and its four hinder legs backwards, into a straight line, which, with the dull greenish straw-coloured abdomen, makes it look exactly like the grass stem on which it is stretched.

Sparassus smaragdulus. Beaten from among sweetgale bushes at Bloxworth Heath; but scarce.

Family DRASSIDÆ.

Drassus lucifugus. Ringwood Heath, Hants, under pieces of turf, June, 1855; also a specimen under dry cow-dung on Lyndhurst Heath, in August, 1858.

D. ater. Under stones and rocks, near Pennsylvania Castle, Portland; but scarce.

D. sericeus. Bloxworth, but not common.

D. cupreus. Under stones, Bloxworth and Portland.

D. micans. This species was discovered by myself under stones and rocks at Portland, in September, 1857, and has been named and described by Mr. Blackwall during the past year, in the 'Annals.'

D. nitens. Under stones and rocks, Portland, September, 1858.

D. propinquus. Lyndhurst Heath; and Portland, under stones, September, 1858.

Clubiona holosericea. Bloxworth, but not common.

C. amarantha. Bloxworth; common.

C. epimelas. Bloxworth; rare.

C. corticalis. Bloxworth; rare.

C. comta. Near Bradford, Yorkshire; October, 1857.

C. accentuata. Common at Bloxworth; beat from trees.

C. domestica. Underneath stones, Portland, September 1858.

C. erratica. Common at Bloxworth and Lyndhurst among heath, rushes, and furze.

Argyroneta aquatica. From ponds near Durham, April 1857.

Family CINIFLONIDÆ.

Ciniflo atrox. Bloxworth and Durham.

C. ferox. Common; Bloxworth, Hatch Beauchamp, Durham, and Lyndhurst.

C. mordax. An adult specimen of this species was given me by my friend Mr. F. Bond, who took it by lamplight in a garden at Freshwater, Isle of Wight. From this specimen Mr. Blackwall has lately named and described it in the 'Annals.'

Ergatis benigna. Very common at Bloxworth and Lyndhurst throughout summer and autumn, in swampy places; where every rush-blossom or tip of heath has its tenant snugly domiciled in a small irregular web.

E. pallens. This pretty species was discovered by myself in a wood near Lyndhurst, in July 1858; it was ensconced in a bramble leaf sewn together by its web, and inside the leaf it brooded over three flattish round white sacs, each enclosing several eggs; it has been lately named and described in the 'Annals' by Mr. Blackwall, who, however, is of opinion that the eggs were not those of this species.

E. latens. Bloxworth and Lyndhurst.

Veleda lineata. This spider was discovered by myself on Lyndhurst Heath, in August, 1858; and, belonging to no known genus, Mr. Blackwall has constructed from its peculiarities a new genus, to which he has given the above name; the few specimens of this peculiar and distinctly marked spider, which I obtained with close searching, were all immature.

Family AGELENIDÆ.

Agelena labyrinthica. Common on heaths at Bloxworth and Lyndhurst; and also in every lane side may be seen its large horizontal webs, with a tube in the centre, in which the occupant lies wait.

A. brunnea. Bloxworth; and Southport, Lancashire, but not common.

A. gracilipes. This species was discovered by myself on Lyndhurst Heath, in September, 1858; and has been lately named and described by Mr. Blackwall in the 'Annals.'

Tegenaria domestica. I have received this species from my friend T. W. Huthwaite, Esq., of Bath, taken there and also at High Wycombe, Buckinghamshire.

T. atrica. Hatch Beauchamp, Bloxworth, and Lyndhurst; in carpenter's shops and old dark sheds, but not common; one under a stone at Portland, in 1858.

T. civilis. At Lyndhurst, August, 1858.

Cælotes saxatilis. Taken when out with Mr. Meade, near Bradford, October, 1857.

Textrix lycosina. I have only found this spider common at Portland, where it spins a snare something like a miniature of that spun by *Agelena labyrinthica* (only not so compactly woven) among the cracks and crevices of the dry and crumbling blue-lias cliffs.

Family THERIDIIDÆ.

Theridion lineatum. Common at Bloxworth and Hatch Beauchamp.

T. quadripunctatum. Bloxworth.

T. Sisypum. Bloxworth and Durham; rare.

T. tepidarium. In peach houses at the seat of Lord Bridport, in Somersetshire; and in pineries at Leweston House, near Sherborne, Dorset.

T. nervosum. Common everywhere.

T. denticulatum. Bloxworth, Hatch Beauchamp, and Lyndhurst.

T. varians. Bloxworth.

T. pulchellum. Bloxworth.

T. albens. Common on Scotch firs, near Bloxworth.

T. filipes. Near Bradford, October, 1857.

Pholeus phalangioides. Common in corners of ceilings and walls of dwelling and out-houses, Bloxworth, Hatch Beauchamp, and Lyndhurst.

Family LINYPHIIDÆ.

Linyphia montana. Very common everywhere.

L. marginata. Common at Bloxworth.

L. pratensis. Hatch Beauchamp and Bloxworth.

L. fuliginea. Bloxworth and Lyndhurst.

L. rubea. Bloxworth.

L. minuta. Lyndhurst.

L. cauta. Bloxworth.

L. socialis. Lyndhurst.

L. alticeps. Lyndhurst and Southport.

L. tenuis. Common in summer-houses, Bloxworth.

- L. terricola.* Bloxworth.
L. anthracina. Bloxworth.
L. pulla. Bloxworth.
L. alacris. Bloxworth.
L. ericæa. On the sand-hills, Southport, October, 1858.
L. insignis. Bloxworth and Lyndhurst.
Neriene bicolor. Bloxworth, Bradford, and Southport.
N. livida. Bradford.
N. flavipes. Bloxworth.
N. cornuta. Bloxworth.
N. rubens. Bloxworth.
N. longipalpis. In University College Quadrangle, Durham, November, 1857.
N. trilineata. Common everywhere.
N. rubella. Bloxworth.
N. variegata. Lyndhurst and Southport.
N. affinis. Lyndhurst, August, 1858; Mr. Blackwall had never before seen the adult female, but had little doubt of its specific identity.
Walckenaera cuspidata. Beneath a stone, Portland, September, 1858.
Pachygnatha Listeri. Bloxworth; rare.
P. Degeerii. Bloxworth, but not common.

Family EPEIRIDÆ.

- Epeira quadrata.* Females very common at Bloxworth and Lyndhurst, though I never obtained but one male.
E. apoclisia. Common everywhere.
E. scalaris. Bloxworth and Lyndhurst, but not common.
E. umbratica. Not uncommon at Bloxworth, Ringwood, and in the New Forest.
E. Agalena. Bloxworth.
E. solers. One of the commonest spiders on the Heath, both at Lyndhurst and Bloxworth.
E. similis. Bloxworth, and in verandahs at Weymouth.
E. calophylla. Very common among furze bushes on Bloxworth Heath.
E. acalypha. This species was discovered by myself on Bloxworth Heath in June, 1853, but was not recorded as a native of Britain until after its capture by Mr. Meade in 1856; it is very abundant on the heath at Bloxworth and Lyndhurst in September and October, and a dozen or more may be seen on one heath plant, as close together as they can

spin their geometric webs, which are placed at all inclinations with the ground, contrary to the usual habit of this genus, which is to place them perpendicularly, except *E. cucurbitina*, whose webs are commonly, though not always, horizontal.

E. cucurbitina. Common at Bloxworth and Lyndhurst.

E. adianta. Two specimens of this beautiful species were discovered by myself on Bloxworth Heath in September, 1857; I have since taken it more freely on Lyndhurst Heath, in 1858; this species was only known before as a continental one.

E. fusca. Bloxworth; and Finchall Abbey, near Durham, but rare.

E. antriada. Bloxworth, and University College, Durham; in out-houses and dark places.

E. inclinata. Common everywhere.

E. diadema. Common everywhere.

E. angulata. A specimen of this spider was found by my friend Mr. F. Bond on a fir tree on Ringwood Heath, one day when we were out entomologising in June, 1854; I have since taken it at Bloxworth, and Mr. Bond has also found it since at Black Park, Bucks; it was previously only recorded as a continental species, but the MS. referred to before (of 1714) contains a description and a well-coloured figure of it.

E. bicornis. Beat occasionally from firs near Bloxworth.

E. conica. Bloxworth; not infrequent on fir trees, and also among flowers in Bloxworth House gardens.

E. tubulosa. This species had not been met with since the time of Lister, until rediscovered by myself near Bloxworth in 1855; I have since met with it freely at Lyndhurst, where it spins and lives in its compact funnel-shaped web among the flowers of rushes, or at the tips of heath shoots.

E. calva. Common on Lyndhurst Heath.

E. Herii. This spider (previously only known as a continental species) was discovered by myself on Lyndhurst Heath, in August, 1858, where it occurs abundantly.

Tetragnatha extensa. Common everywhere.

Tribe ENOCULINA—Family DYSDERIDÆ.

Dysdera erythrina. Common at Portland, under rocks and stones.

D. Hombergii. Bloxworth, under loose bark; and Lyndhurst, running on the ground, but not common.

Segestria senoculata. A single immature specimen under loose bark at Lyndhurst, in August, 1858; common near Bradford, Yorkshire, among the loose stones of walls, &c.

Onops pulcher. Bloxworth.

In the above list I have only given particulars of time, &c., in respect to those that are considered as yet rare and local, and those which I have discovered myself. Of many of the commonest kinds I have perhaps only myself met with one or two specimens, and in those cases I have omitted any notice of their being common or rare.

It will be seen that out of 184 species which I have met with (all, except two or three in Dorset, Somerset, and Hants) there are seventeen species, and two genera new; of these one genus and nine species are new to Science, and one genus and eight species new to Britain. The greater part of these are far from being among our minute spiders—some of them are of considerable size and great beauty. These results of taking notice of this interesting order, while collecting other orders, will I trust induce some others among our now legion of entomologists to do the same; and I have not the least doubt that the species of Arachnida in Britain, especially in the southern counties of England, are not nearly yet exhausted, but that a rich harvest would repay any ordinary search.

I will only now add a few words on the mode of taking spiders, which I have found most successful, and by which most of my novelties have been brought to light. First, among timber trees and brushwood, by beating into a large entomological folding net; next, among long grass, rushes, fern and heath, by sweeping with a very stiff strong sweeping net, taking especial care to scrape as close to the ground as possible; this is hard work, and will soon blister the hands if done properly—but the effect, particularly among heath, has been wonderful. Of course, in this way no knowledge of the ways and habits of spiders can be got—this knowledge must depend entirely on a good eye, great patience, and a habit of observation. Still it is something to ascertain the mere existence of species in any locality; and as yet my chief exertions have been directed to this end: with regard to most of my novelties, everything almost has yet to be discovered, even to the time of their coming to maturity, as most of them were immature when taken. After the lapse of a year or two I took forward to having more leisure to follow up a course of observation on their manners and customs; and meanwhile I hope some of our “butterfly catchers” will take up the study and collecting of this order which as yet has so very few votaries.

O. PICKARD-CAMBRIDGE.

Southport, Lancashire,

February 10, 1859.

Capture of Deilephila Geki.—In the 'Zoologist' (Zool. 6066), it is stated that a specimen of this insect is in the Taunton Museum: it was presented to the Museum by John Woodland, a gentleman now residing at Bridgwater, who has informed me that it was taken in a garden at Taunton; he has also lately shown me another specimen, which was taken in the same or a neighbouring garden, some time in the last summer.—*Thomas Clark; Halesleigh, March 4, 1859.*

Agrotis Præcox.—Your correspondent "Talpa" (Intel. v. 132) states that he has been unable to find the larva of this insect; as I have had little difficulty in obtaining it in plenty, I will endeavour to enlighten him as to my method of procuring them. Let him visit the sand-hills on the coast some fine warm day about the end of May, when he will not fail to observe the tracks made by the larvæ crawling on the sand at the edges of the patches of dwarf willows; by tracing one of these he will find it abruptly terminate at a small hillock or upheaving of the sand, under which is the larva. Having once become acquainted with them he need not trace the tracks, but, avoiding making too many tracks himself, carefully search for the hillocks or burrows, where he will have no difficulty in procuring as many as he likes. I have taken in this way upwards of eighty in an hour, and there is little difficulty in rearing them; mine fed well on the willow, the perfect insect appearing in August.—*G. A. Almond; 50, Oliver Street, Birkenhead.*—*From the 'Intelligencer.'*

Notes on Xanthia ocellaris.—Having given attention to this reputed British species, and availed myself of all the information I can concerning it, I find that the statement as to its being British is liable to doubt, and as many of the facts connected with it are not generally known I have forwarded you the result of my researches, for the benefit of those who are interested in the question. The first so-called British specimen was, I understand, captured at Brighton in 1856, and was forwarded to Mr. Doubleday for confirmation, but the owner being a dealer in foreign Lepidoptera, and his word not being thought reliable, it was not then admitted into our lists. Last year five specimens, which were asserted to belong to this new species, were taken at Brighton and Deal, but as they do not possess the characteristics, which, according to M. Guenée, they should possess, the question naturally arises, Are not the so-called specimens only varieties of *Xanthia gilvago* mistaken for *X. ocellaris*? In order to investigate this inquiry, I will refer to each of the cases, but before doing so it is advisable to give a description of *X. ocellaris*, so that we may better understand the question at issue; the one I give is extracted from M. Guenée's 'Noctuelites':—"This *Xanthia* is perfectly distinct from *X. gilvago*: it differs in the anterior wings, which are more pointed at the tip, the costal portion of which is hollowed in its veins, which are usually lighter than the ground-colour, in its posterior wings, which are of a purer white, and only dusky by some gray hairs on the border of the abdomen. The black of the reniform stigma is almost always ocellated and the lines more distinct." With the above description as a criterion, I have examined the specimens captured by Mr. H. Pratt, of Brighton, and find that, although it agrees with *X. ocellaris* in some of its details, in others it is totally deficient: it agrees in the upper wings being more pointed at the tip, in the costal portion being slightly hollowed, and in the hind wings being dusky by gray hairs proceeding from the abdomen; but in the black of the reniform stigma being ocellated, in the veins being lighter, or the wings of purer white, it differs much. Mr. Allis and the Members of the Entomological Society to which I belong are of opinion that it is only *X. gilvago*, in which I fully concur.

I forwarded it to Mr. Doubleday, who informs me that he cannot as yet satisfactorily decide upon it. The Rev. H. Burney, in a letter which he kindly wrote to me on the subject, says, "I have seen two specimens of the so-called *X. ocellaris*, both very different, yet each, I think, is only a variety of *X. gilvago*. Mr. Harding sent me the first, which was the best of the two taken by him at Deal; I sent it to Mr. Doubleday, and he returned it as a bright variety of *X. gilvago*. The other, a very light specimen, was sent to me by Mr. Tidy, a pretty looking insect, but in markings I could see no material difference from *X. gilvago*: this I also sent to Mr. Doubleday, who considers it to be the latter species. Mr. Bond and others also saw Mr. Tidy's and Mr. Harding's specimens, and pronounced them to be *X. gilvago*." I am informed by Mr. Pratt that Mr. Tidy's specimen was exhibited at the Entomological Society of London, and that Mr. Tidy was assured that it was *X. ocellaris*, which statement was confirmed by Mr. Newman. It will be perceived that Mr. Tidy's specimen thus acknowledged was the same which Messrs. Doubleday, Bond, Stevens, Burney and others consider only as a variety of *X. gilvago*. Whence this diversity of opinion? According to M. Guenée *X. gilvago* varies, but not so much as *X. ocellaris*. This may in some degree account for the difficulty in recognising *X. ocellaris*, but when there are distinct characteristics in the perfect insect one would believe that it is surmountable, and that the peculiarities could be detected. Had the difference existed only in the larvæ, had *X. gilvago* and *X. ocellaris* been in a similar position to *Acronycta tridens* and *A. Psi* one could have understood the relative position of each, and on the required proofs being given as to the authenticity of the larva, one would accept the insect for what it was represented to be; but when a difference is stated to exist, not only in the larva, but also in the perfect insect, which cannot be found in specimens that have been acknowledged as *X. ocellaris*, I am at a loss at what conclusion to arrive. I have referred to all the recorded specimens asserting a claim to this name, with the exception of one taken by Mr. Turner. Concerning it I do not know more than what I learned from Mr. Allis, who informs me that many think it a variety of *X. gilvago*. Mr. Doubleday tells me that Lederer, in his recent 'Catalogue of Noctua,' unites them as varieties of one species, but after the satisfactory accounts given by M. Guenée, proving the distinctions both in the larva and the imago, I shall not enter upon this. In conclusion I hope that before this species is included in our lists it will be fully ascertained that some of the specimens are genuine, and I trust it will not be admitted without proper investigation, to be at a future time erased.—Robert Anderson; Coney Street, York, March 9, 1859.

PS.—Since writing the above, I have received Mr. Doubleday's 'Synonymic List of British Lepidoptera' (second edition), and am glad to observe that he places this insect amongst the reputed British species, which position is, I think, its proper place, and I hope that those authors and compilers of lists who have already included this species will receive the facts connected with it as a lesson, teaching them not to be too zealous in adding new species before they have proper proofs as to the truthfulness and accuracy of their information.—R. A.

Correction of an error.—I am much obliged for your correction of an error of mine in the 'Zoologist' (Zool. 6388), in which I stated that the death's head moth had damaged the combs of a hive of bees; it was the honey moth (*Galleria cerella* of Doubleday's list) as you say, one of the worst enemies the bees can have.—H. W. Newman; Cheltenham, February 14, 1859.

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CONTENTS.

INSECTS.—Topsell's "History of the Wasp," *Frederick Smith, Esq.*, 6465. Be roosting by the Mandibular Process, *Edward Newman*, 6468. Note on *Xylocopa nigrita*, *Frederick Smith, Esq.*

PROCEEDINGS OF SOCIETIES.—Entomological Societies, 6469.

On the Tendency of Species to form Varieties, *Rev. Arthur Hussey, M.A.*, 6475.

Notice of the Various Species of Bovine Animals, 6475.

Reason and Instinct, *Rev. J. C. Atkinson, M.A.*, 6485.

BIRDS.—Instinct of Birds.—*Colonel H. W. Newman*, 6491. Occurrence of the Great Ash-coloured Shrike in Banffshire; Occurrence of a Variety of the Common Bunting in Shetland, *Thomas Edward*, 6492. Late Swallows, *Arthur Hensman Esq.*, 6492. Sea Birds found Inland, *Rev. G. S. Marsh*, 6492.

Another Sea Serpent, *J. H. van Lennep*, 6492.

FISHES.—The Shower of Fish in the Valley of Aberdare, *Rev. John Griffith*, 6493.

ARACHNIDA.—Remarks on Arachnida, taken chiefly in Dorsetshire and Hampshire, *Rev. O. Pickard-Cambridge, M.A.*, 6493.

INSECTS.—Capture of *Deilephila Galii*, *Thomas Clark, Esq.*, 6503. *Agrotis Præcox*, *G. A. Almond, Esq.*, 6503. Notes on *Xanthia ocellaris*, *R. Anderson, Esq.*, 6504. Correction of an Error, *Colonel H. W. Newman*, 6504.

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